



The **Hawai'i Department of Health (HDOH), Hazard Evaluation and Emergency Response Office (HEER Office)** is a state environmental health division whose mission is to protect human health and the environment. The HEER Office provides leadership, support, and partnership in preventing, planning for, responding to, and enforcing environmental laws relating to releases or threats of releases of hazardous substances.

## Arsenic in Canec Ceilings and Wallboard in Hawai'i

This fact sheet provides homeowners, commercial building owners and operators, demolition and construction contractors, realtors, and others with an overview of the potential public health concerns associated with arsenic found in canec building materials, which were manufactured in Hawai'i from the early 1930s to the early 1960s. Additionally, this fact sheet discusses how to determine if canec is present, safe management practices during handling, demolition, and disposal, and provides resources for further information.

### Background

#### *What is canec?*

Canec is the common name for a fiberboard building material that was made from sugar cane bagasse, the residual fiber that remains after the juice has been extracted from the sugar cane. In the early 1930s, Hawaiian Cane Products Ltd. established a bagasse fiberboard manufacturing plant in Hilo, along the banks of Waiakea Pond. Hawaiian Cane Products was sold to the Flintkote Company in 1948, which continued to operate the canec plant until about 1960. Canec was treated with inorganic arsenic compounds as an anti-termite agent. The plant produced canec in sheets similar in size to drywall, as well as other sizes for use as ceiling and wallboard. Canec was used for interior ceilings and walls in many residential and commercial structures throughout the state of Hawai'i.



Photo Source: Hawaii Business and Industry Cover, October 1963



**ABOVE:** This is a historic photo of the canec plant formerly located in Hilo, Hawai'i. Flintkote Company owned and operated the plant from 1948 until about 1960.

**LEFT:** Sugar cane bagasse is the residual fiber that remains after the juice has been extracted from the sugar cane.



## Identifying Canec Materials

### ***How do I determine if canec building materials are present in my structure?***

Canec may be found in ceilings and/or interior walls as a tile or panel in buildings constructed prior to 1964. On ceilings, canec is often characterized with V-shaped groove joints that are arranged in linear patterns. The material itself is a fiberboard that is brownish-orange in color, though the exposed surface is typically finished smooth and painted, making it look similar to modern drywall. The individual fibers in canec building materials are fine and are not uniformly oriented. Canec is noticeably softer than drywall and can be dented with a firm press of a fingernail.

If a visual check of the material is inconclusive, then a sample of the material can be sent to a laboratory for evaluation and testing for inorganic arsenic. Based on a review of reports to the HEER Office, which included canec building material samples collected from four different sites in Hawai'i, canec samples have contained arsenic in the range of 1,000 to 4,000 mg/kg (parts per million). By comparison, the volcanic soils in Hawai'i typically have a natural background concentration of arsenic less than 20 mg/kg. Natural arsenic in soil does not pose a public health concern.



*Canec ceiling panels with characteristic V-shaped groove joints.*



*A canec panel that is broken. Note the characteristic fibrous texture and brownish color.*

## Health Concerns

### ***What are the human health concerns associated with canec?***

Although elevated in comparison to natural background, inorganic arsenic in canec material does not pose exposure or potential health concerns for building residents or workers, provided that the canec is in good condition and not rotting or "powdering away." No health effects caused by short time (acute) exposure to high levels of arsenic in canec, or to lower concentrations for a long time (chronic exposure) have been reported to HDOH. However, daily exposure to very high levels of inorganic arsenic over many years can result in various health effects, including an increased risk of cancer. As a result, exposure to deteriorating canec should be minimized.

Arsenic compounds in the environment have no distinct smell, taste, or visible appearance, so it is difficult to know when exposure is occurring. The arsenic in canec is not "volatile", so it is not released as a gas or vapor over time. However, it is possible that canec particles with inorganic arsenic could be physically released to the environment depending on the age, condition, and handling of the canec. For example, if canec materials become worn and brittle due to age or structural or water damage, or damaged during renovation or demolition activities (e.g., breaking, cutting, drilling, etc.), then potential for exposure to dust or fibers containing arsenic is increased.



Parents who have young children are advised to pay special attention to their child's actions in structures with deteriorated canec or during renovation projects involving canec, due to a child's increased vulnerability to exposure from common and frequent hand-to-mouth activities. Demolition contractors or those renovating canec ceilings and walls may also be exposed to higher concentrations of inorganic arsenic-containing dusts if precautions are not taken. Exposures to deteriorated canec or canec dust during renovation or demolition projects should be avoided.

## **Removal, Handling, and Disposal of Canec**

### ***Should all canec building materials be removed from my structure?***

If the canec building materials are in good condition, leaving them in place should not result in arsenic exposure. Throughout the lifetime of the structure, care should be taken to avoid damage to the canec building materials. If the canec is deteriorated or damaged, it can be carefully repaired and painted or removed and replaced.

### ***How do you handle or dispose of canec building materials?***

If removing, repairing, or replacing canec building materials is necessary, the HEER Office recommends the following protective measures:

#### **Work Practices**

- Wear a dust mask (N95 type), gloves, a long-sleeved shirt, and safety glasses when cutting or handling canec.
- Wash hands and other exposed skin thoroughly after working with canec and prior to eating or drinking.
- Wash work clothes separately from other household clothing to avoid cross-contamination.
- Employers on jobs involving canec handling/demolition work should ensure protection of their employees by addressing potential exposures in their safety and health programs.

#### **Limiting Exposures**

- During renovation or demolition of canec, limit cutting, breaking, drilling, sawing, or creating dust as much as possible.
- After completing removal/replacement activities, the work area should be thoroughly cleaned with a vacuum containing a high efficiency particulate air (HEPA) filter.
- Do not reuse canec where it may come into direct or indirect contact with drinking water.
- Do not reuse canec where it may become mixed into food (e.g., animal feed or beehives).
- Do not shred or break up canec for another use, for example as compost or mulch.
- Do not burn canec in open fires, stoves, fireplaces, or residential boilers because toxic substances may be produced as part of the smoke and ashes.

#### **Disposal**

Wrap waste canec in plastic or place in plastic bags to avoid spreading dust during transportation and disposal. Canec from residential, commercial, and industrial sites must be disposed of at a permitted landfill facility. Canec building materials are exempt from State laws requiring a hazardous waste determination to be made prior to disposal. As a result of this exemption, testing canec for arsenic content or leaching characteristics is not required by the state for disposal. The exemption applies whenever canec building materials are



segregated from other building materials and disposed of separately. When canec is mixed with other building demolition waste, the combined waste could be subject to hazardous waste characterization before disposal – contact the HDOH Solid and Hazardous Waste Branch for questions on testing mixed demolition wastes containing canec, or other questions on disposal of canec. The permitted landfill should be notified prior to disposal of canec materials so the canec can be appropriately segregated or handled in a manner to prevent landfill employees from being exposed during their operations. All disposal of canec should comply with applicable county and state landfill rules.

**Testing Canec for Asbestos (demolition/renovation of certain building types)**

A HDOH certified asbestos inspector is generally required to inspect and sample suspect building materials for presence of asbestos prior to demolition or renovation activities for institutional, commercial, public, industrial, and certain residential structures such as condominiums, apartments, and co-ops (not private single family homes). Canec is considered a suspect building material for demolition/renovation related asbestos surveys in these types of buildings. Although canec is not known to have contained asbestos as part of its manufacturing process, in certain cases an asbestos-containing paint or surface coating could have been applied to the canec after it was installed. The HDOH Indoor and Radiological Health Branch can answer questions regarding asbestos surveys.

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**Further Information**

***For questions about this fact sheet, contact:***

Hawai'i Department of Health, Hazard Evaluation and Emergency Response Office,  
Website: <http://hawaii.gov/health/environmental/hazard/index.html>  
Phone: (808) 586-4249

***For questions about the disposal of canec materials, contact:***

Hawai'i Department of Health, Solid and Hazardous Waste Branch,  
Website: <http://hawaii.gov/health/environmental/waste/index.html>  
Phone: (808) 586-4226

***For questions about asbestos sampling requirements of canec building materials contact:***

Hawai'i Department of Health, Indoor and Radiological Health Branch,  
Website: <http://hawaii.gov/health/environmental/noise/index.html>  
Phone: (808) 586-5800

**Links**

HAR 11.261.4(b)(9) – Describes the exemption applicable to canec building materials that allows disposal in permitted landfills without special testing procedures. See paragraph 11-261-4(b)(9) on page 261-21.

<http://gen.doh.hawaii.gov/sites/har/AdmRules1/11-261.pdf>

U.S. Occupational Safety and Health Administration (OSHA) link on arsenic – provides information on maximum airborne arsenic exposures allowable for employees in the workplace, and required protections if the maximum airborne exposure levels are exceeded.

<http://www.osha.gov/SLTC/arsenic/index.html>

